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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 09/880,632
Filing Date: June 12, 2001
Appellant(s): TANG ET AL.

Jody C. Bishop
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 20 August 2007 appealing from the Office action mailed 02 May 2007.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The following are the related appeals, interferences, and judicial proceedings known to the examiner which may be related to, directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal:

US 09/880,631

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

6,775,692	Albert et al	8-2004
5,774,660	Brendel et al	6-1998

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Albert et al (hereinafter "Albert", 6,775,692) in view of Brendel et al (hereinafter "Brendel", 5,774,660).

Albert teaches the invention, substantially, as claimed including TCP request forwarding and monitoring (at least Abstract).

As per Claim 1, Albert teaches a communication network, a method of TCP state migration comprising the steps of:

a) establishing a communication session between a client and a front-end node, said front-end node accessing a plurality of back-end web servers forming a web server cluster that contains content (at least col. 7, lines 36-60; forwarding agents connecting client/servers);

b) receiving a HTTP request from said client at said first BTCP module (at least col. 15 line 36 - col. 16 line 15; col. 8, lines 17-25; http from client);

d) extending said communication session to said selected back-end web server (at least col. 14 line 65 - col. 15 line 27; SYN/ACK packets);

e) sending said HTTP request to said selected back-end web server (at least Fig. 5; data to host/server);

f) wherein packets received at said BIP module from said client are forwarded to said selected back-end web server (at least Fig. 5; col. 14, lines 1-15; forwarding data packet); and

g) terminating said communication session at said front-end node after said HTTP request is fully processed (at least col. 32, lines 46-63; connection ends).

Albert fails to explicitly teach a first bottom TCP (BTCP) module located below a first TCP module in a first operating system at said front-end node; c) parsing said HTTP request to determine which back-end web server, a selected back-end web server, in said plurality of back-end web servers can process said HTTP request, said selected back-end web server not said front-end node; handing-off an initial TCP state of said first BTCP module to said selected back-end web server; and switching a bottom IP (BIP) module, located below an IP module at said front-end node at said front-end node to a forwarding mode. However, the use and advantages for using such a system is well known to one skilled in the art at the time the invention was made as evidenced by the teachings of Brendel. Brendel teaches TCP state migration wherein a TCP connection is made between a client and the load balancer (front end node), and

subsequently transfers the connection to an assigned server (at least col. 11 line 51 – col. 12 line 63) and modified IP input and output modules (see col. 15, lines 11-39; col. 15 line 63 – col. 16 line 20). Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made, to incorporate the use of Brendel's system into Albert as this would further enhance Albert's system for use in load balancing and allowing the state of the TCP connection to be shared with the server so as to, in essence, remove the load balancer (front end node) from the TCP connection, thus improving the load balancing of Albert as it also allows delayed load balancing so that the backend servers of Albert do not need to have the same content (see Brendel col. 11, lines 28-36). Further, all the claimed elements were known in the prior art and one skilled in the art could have combined the elements of as claimed by known methods with no change in their respective functions, and the combination of Brendel with Albert would have yielded predictable results to one of ordinary skill at the time of the invention.

As per Claim 2, the method as described in Claim 1, wherein said content is partially replicated between each of said plurality of back-end web servers (at least col. 3, lines 22-57; clustered servers).

As per Claim 3, the method as described in Claim 1, wherein said back-end web server includes a second BTCP module that is located below a second TCP module in a second operating system at said selected back-end web server (at least Fig. 3; col. 11 line 30 - col. 12 line 5).

As per Claim 4, the method as described in Claim 1, wherein said initial TCP state is associated with said communication session, said communication session established for the transfer of data contained within said content to said client (at least Fig. 5; col. 12, lines 22-35; TCP connection).

As per Claim 5, the method as described in Claim 4, wherein said step d) comprises the further steps of:

sending a SYN packet to said selected back-end web server (at least col. 12 line 23 - col. 13 line 51),

said SYN packet intercepted by a second BTCP module (at least col. 12 line 23 - col. 13 line 51; received by forwarding agent),

said SYN packet originally sent from said client to said front-end node in requesting said communication session (at least col. 12 line 23 - col. 13 line 51),

said SYN packet stored at said first BTCP module (at least col. 12 line 23 - col. 13 line 51);

including an initial sequence number within said SYN packet that enables said second BTCP module to understand proper TCP state of said first BTCP module said communication session (at least col. 12 line 23 - col. 13 line 51; col. 19, lines 12-15);

receiving a SYN/ACK packet from said selected back-end web server, said SYN/ACK packet updated by said second BTCP module to reflect said proper TCP state of said first BTCP module (at least col. 12 line 23 - col. 13 line 51); and

sending an ACK packet from said first BTCP module to said selected back-end web server, said ACK packet originally sent from said client to said front-end node in

establishing said communication session (at least col. 12 line 23 - col. 13 line 51; TCP connection being established between the client, forwarding agent and server).

As per Claim 6, the method as described in claim 1, wherein said method comprises the further step of:

sending response packets from said selected back-end web server to said client in a communication path that does not include said front-end node by changing headers of said response packets such that it appears that the source of said response packets is said first BTCP in its proper TCP state (at least col. 7 line 60 - col. 8 line 11; modifying addresses in header).

As per Claim 7, the method as described in Claim 1, wherein step g) comprises the further steps of:

intercepting TCP control packets from a second TCP module located at said selected back-end web server at said second BTCP module (at least Fig. 13; col. 12 line 23 - col. 13 line 51; col. 32, lines 46-63; TCP connection ending between the client, forwarding agent and server);

sending said TCP control packets to said first BTCP module from said second BTCP module (at least Fig. 13; col. 12 line 23 - col. 13 line 51; col. 32, lines 46-63; TCP connection ending between the client, forwarding agent and server);

sending said TCP control packets to said client from said first BTCP module (at least Fig. 13; col. 12 line 23 - col. 13 line 51; col. 32, lines 46-63; TCP connection ending between the client, forwarding agent and server); and

terminating said communication session at said front-end node and said back-end web server (at least Fig. 13; col. 32, lines 46-63; connection ends).

As per Claim 8, the method as described in Claim 1, wherein said front-end node and said plurality of back-end web servers comprise a web site, said front-end node providing a virtual IP address for said web site (at least col. 28, lines 34-38; col. 4, lines 43-52; col. 9, lines 45-58; web virtual IP addresses).

As per Claim 9, the method as described in claim 8, wherein said front-end node, and said plurality of back-end web servers are coupled together by a local area network (at least Fig. 2; col. 7, lines 37-60).

As per Claim 10, the method as described in Claim 8 wherein said front-end node and said plurality of back-end web servers are coupled together by a wide area network (at least Fig. 2; col. 7, lines 37-60).

Claims 11-29 do not substantially add or define any additional limitations over claims 1-10 and therefore are rejected for similar reasons.

(10) Response to Argument

Appellant's arguments filed 20 August 2007 have been fully considered but they are not persuasive.

Appellant argues, in substance, that Albert does not teach a first bottom TCP (BTCP) module located below a first TCP module in a first operating system at said front-end node; parsing said HTTP request to determine which back-end web server, a selected back-end web server, in said plurality of back-end web servers can process

said HTTP request, said selected back-end web server not said front-end node; and handing-off an initial TCP state of said first BTCP module to said selected back-end web server; and switching a bottom IP (BIP) module, located below an IP module at said front-end node at said front-end node to a forwarding mode.

Appellants argue, in substance, that Brendel fails to teach handing-off an initial TCP state of said first BTCP module to said selected back-end web server/ second BTCP module, nor first and second BTCP modules and BIP modules.

In response to Appellant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

In addition, Brendel teaches TCP state migration wherein a TCP connection is made between a client and the load balancer (front end node), and subsequently transfers the connection to an assigned server (at least col. 11 line 51 – col. 12 line 63), wherein a load balancer transfers (hands off) the TCP connection and state to the assigned server. Brendel also teaches modified IP input and output modules (see col. 15, lines 11-39; col. 15 line 63 – col. 16 line 20), either of which can be 'below' the other, and further teaches using an IXP protocol which is above the IP input and output modules, as incoming and outgoing packets have their protocol changed from TCP to IXP, with the IXP packets being passed back *up* to the modified IP input module.

Appellant argues Albert does not teach the elements of claim 3, 5-7, 12, 14, 15, 17, and 23-28.

In response to Appellant 's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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